

IMF Working Paper

Sovereign Wealth Funds and Financial Stability—An Event Study Analysis

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Monetary and Capital Markets

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Abstract

This paper examines financial stability issues that arise from the increased presence of sovereign wealth funds (SWFs) in global financial markets by assessing whether and how stock markets react to the announcements of investments and divestments to firms by SWFs using an event study approach. Based on 166 publicly traceable events collected on investments and divestments by major SWFs during the period from 1990 to 2009, the paper evaluates the short-term financial impact of SWFs on selected public equity markets in which they invest. The impact is analyzed on different sectors (financial and nonfinancial), actions (buy and sell), market types (developed and emerging markets), and level of corporate governance (high and low score). Results, based on these 166 events, show that there was no significant destabilizing effect of SWFs on equity markets, which is consistent with anecdotal evidence.

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I. INTRODUCTION

Since the beginning of the financial crisis in the summer of 2007, financial stability has been at the forefront of policy discussions. At the same time, sovereign wealth funds (SWFs) have become dominant players, as they have injected significant capital in major financial institutions. Recently in some countries, SWFs were instructed by their governments to invest into domestic financial institutions and the overall stock market in order to support battered stock prices. Research on the financial stability implications of these funds has been slowly emerging, hampered by lack of data on their asset allocations.

There have been many arguments put forth regarding the potential positive and negative effects of SWFs on global financial markets. For example, some argue that SWFs can play a stabilizing role in global financial markets. First, many commentators point out that as long-term investors with no imminent call on their assets, and with mainly unleveraged positions, SWFs are able to sit out longer during market downturns or even trade against market trends. In addition, SWFs in some countries, particularly in the Middle East, have recently supported domestic equity markets and financial institutions. Second, large SWFs may have an interest in pursuing portfolio reallocations gradually so as to limit adverse price effects of their transactions. Third, SWFs could, as long-term investors and by adding diversity to the global investor base, contribute to greater market efficiency, lower volatility, and increased depth of markets. Fourth, SWF investments may enhance the depth and breadth of markets.

Although SWFs appear to have been a stabilizing force thus far, given their size, there are circumstances in which they could cause volatility in markets. Having large and often intransparent positions in financial markets, SWFs—like other large institutional investors—have the potential to cause a market disturbance. For instance, actual or rumored transactions may affect relative valuations in particular sectors and result in herding behavior, adding to volatility. Deeper markets, such as currency markets, can also be affected, at least temporarily, by rumors or announcements about changes in currency allocations by central banks or SWFs. To the extent that SWFs invest through hedge funds that rely on leverage or are subject to margin requirements, such investments may inadvertently magnify market changes. For markets to absorb flows from any major investor class without large price fluctuations, it helps if they can anticipate the broad allocation and risk-preference trends of such investor classes. Opacity about such trends can lead to inaccurate pricing and volatility. As regards these financial stability implications of SWFs, both theoretical and empirical research has begun to be implemented.

Recent capital injections by SWFs in financial institutions have intensified the debate on the impact on financial stability. SWFs from East Asia and the Middle East were frequently in the news, as major mature market financial institutions required additional capital. In total, SWFs have reportedly contributed more than \$50 billion of such capital since November 2007. The capital injections by SWFs have augmented the recipient financial

institutions' capital buffers and have been helpful in reducing various firm specific risk premia, at least in the short term, as the injection curtailed the need to reduce bank assets to preserve capital. The announcements of capital injections from SWFs have assisted in stabilizing share prices and the elevated CDS spreads, at least over the short run (Global Financial Stability Report, April 2008). In most cases, after the announcement of new capital injections, the initial share price reaction to the SWF investments was positive, with announcements of asset write-downs offset by hand-in-hand capital injections from investor groups in which the SWF had a significant role. Although other factors are not taken into account, this initial evidence supports the view that SWFs could have a volatility-reducing impact on markets.²

This paper, using an event study approach and based on a hand collected database, endeavors to deepen the analysis of SWFs' impact on financial stability by differentiating scenarios, including investments and divestments in advanced and emerging economies, financial and nonfinancial sectors, higher and lower level of corporate governance. The overall findings suggest that there is no significant destabilizing effect of SWFs on equity markets. This empirical study contributes to the emerging academic literature that seeks to analyze the behavior of SWFs in financial markets.

The paper proceeds as follows: Section II briefly reviews the literature and some conceptual issues. Section III outlines an event study approach and describes data. Section IV presents empirical results. Section V concludes.

II. LITERATURE REVIEW

SWFs are defined as special-purpose investment funds or arrangements owned by the general government. They are often established out of balance of payments surpluses, official foreign currency operations, proceeds of privatizations, fiscal surpluses, or receipts resulting from commodity exports. Their total size has been estimated at \$2 trillion to \$3 trillion, but many of them have probably seen large unrealized losses from the ongoing financial crisis combined with a sharp reduction in oil prices³. These unrealized losses have been higher for SWFs that have a higher share of equities in their investment portfolio or large illiquid

² With the continuing increase in banks' losses and writedowns during the subprime crisis, the rescue of Bear Stearns, collapse of Lehman Brothers and U.S. government intervention into major financial institutions, the longer term share price development of banks that obtained initial capital injections from various SWFs, has been obviously very negative. But the short-term reaction of SWFs financial support has been perceived as very supportive by the financial market in most cases.

³ A new report by International Financial Services London has revealed that sovereign wealth funds total assets increased 18 percent to \$3.9 trillion in 2008 from \$3.3 trillion in 2007. Total assets are now contracted to reach \$8 trillion by 2015, down from their \$10 trillion estimated in 2008.

positions in private equity or hedge funds. Given that SWFs typically have a fairly long investment horizon, they are likely to sit out these unrealized losses.

Given the lack of publicly available data on SWF asset allocations, a strand of research has been on the theory side. Lam and Rossi (forthcoming) develop a theoretical model that aims to examine the impact of SWFs on global financial stability during periods of stress. Their findings indicate that SWFs have a risk-sharing role in financial markets. As part of the IMF-coordinated process of the Santiago Principles that provide generally accepted principles and practices for SWFs, Hammer, Kunzel, and Petrova (2008) examine the asset allocation and risk management frameworks of SWFs based on a detailed survey. The results show that SWFs have specific investment objectives in place, adopt an asset approach (mean-variance style) in determining their asset allocation strategy, utilize common risk measures (e.g., credit ratings, value-at-risk models, tracking errors, duration, and currency weights) for their risk management, and have explicit limits in their investment classes and instruments.

Simulations of SWFs' asset allocations have been undertaken by Kozack, Laxton, and Srinivasan (forthcoming). Specifically, they create two stylized diversified portfolios, one mimicking Norway's SWF and the other representing some well-established SWFs, and they conduct a scenario analysis of the impact from a further diversification of sovereign assets. While the calibrations are highly sensitive to the underlying model assumptions, the findings indicate that advanced economies will see lower capital inflows, while emerging market countries will be the primary beneficiaries. Their quantitative results are consistent with the back-of-the-envelope calculations of Beck and Fidora (2008), which imply a net capital outflow from the United States and the euro area and net inflows to emerging market countries over the medium-term. In the same vein, Jen and Miles (2007) and Hoguet (2008) points out that there is scope for the global equity risk premium to fall and for real bond yields to rise if SWFs allocate their assets to equities. In addition, as SWFs increasingly diversify into global portfolios, their activities may place some downward pressure on the dollar as they exit dollar-denominated assets.

There has been some empirical research, using equity market indicators and an event study approach to examine the role of SWFs as major institutional investors. For instance, in an event study, Chhaochharia and Laeven (2008) find that the announcement effect of SWF investments is positive. They report that share prices of firms respond favorably when SWFs announce investments, in part because these investments happen when their targets are in financial distress. But the long-run performance of equity investments by SWFs tends to be poor (see Fotak, Bortolotti, and Megginson, 2008, for similar results). Another event study analysis by Bortolotti, Fotak, Megginson, and Miracky (2009) based on the Monitor Group database of SWF transactions also finds a positive short-run announcement effect of SWF investments and negative long run abnormal returns. Dewenter, Han, and Delesta (2009) and Knill, Lee and Mauck (2009) obtain similar results. Kotter and Lel (2008) show that the cumulative abnormal return of SWF investments has an announcement effect similar to that

of investments by hedge funds and institutional investors such as CalPERS on stock returns. In addition, investments by more transparent SWFs have a larger cumulative abnormal return by an order of 3.5, suggesting that voluntary SWF disclosure might serve as a signaling device to investors. In addition, Kotter and Lel (2008) also obtain a significant negative but small announcement impact from SWFs' divestures. Beck and Fidora (2008) conduct a country case study of Norway's SWF and ask whether its exclusion of companies that violate the ethical guidelines of the ministry of finance exhibit price pressures on those companies. Their findings suggest no significant negative abnormal returns following the divesture of these companies.

To summarize, existing research on SWFs suggests that they can be a stabilizing force in global financial markets. Event studies do not find a destabilizing impact from SWF investments and divestments in equity markets, while simulations of SWF asset allocations only imply a gradual shift with modest economic effects. With SWFs improving their transparency and disclosure over time, the availability of historical SWF transactions would provide researchers with the necessary data to further examine their implications for financial stability.

III. DATA AND METHODOLOGY

This empirical research assesses whether stock markets react to the announcements of investments and divestments to firms by SWFs using an event study approach. The objective is to investigate the information content of these announcements. Based on 166 publicly traceable hand collected events of investments and divestments by major SWFs during 1990-2009, this section evaluates the short-term financial impact of SWFs on selected public equity markets in which they invest. Moreover, the impact will be further analyzed on different sectors (financial and nonfinancial), actions (buy and sell), market types (developed and emerging markets), as well as level of corporate governance (higher and lower level). The results are expected to give some hints on how stock markets react to the capital investments and divestments by SWFs, and present some implications on SWFs' stabilizing role in global financial market. Investigating divestments is of particular interest since if stock price reactions are abnormally high (relative to the market) there may be destabilizing effects to the degree that others "front run," "herd" or otherwise mimic SWFs' investment behavior. This might be particularly problematic if prices slip below pre-defined target levels of other investors, and thus prompting their forced sales.

A. Data

Several SWFs that have bought or sold shares of firms in the advanced and emerging stock markets are included in the study. Among them are Abu Dhabi Investment Authority, China Investment Corporation, Government of Singapore Investment Corporation, Kuwait Investment Authority, Korea Investment Corporation, Libyan Investment Authority, Mubadala, Qatar Investment Authority, and Temasek. The source of information on the

events is SWFs' websites and various financial news and reports such as Factiva. Target firm actual total returns (and price indices) and country stock market returns (and price indices) are obtained from Datastream International database.⁴ This search results in a total of 166 investment/ divestment events in 115 unique firms, with some firms receiving multiple SWF investments through time between 1990 and 2009. This sample is then combined with firm-level and country level data collected from Bloomberg, and SWF-specific data from various sources including Truman (2008)⁵.

Table 1 describes the number of SWF investments and divestments across the country of target firms, while Table 2 displays the distribution of the sample by the identity of the acquiring SWF. Given public availability of individual buy and sell transactions, observation numbers by the two Singapore SWFs GIC and Temasek are dominating the sample. Figure 1 shows the ratios on SWFs' investments/ divestments in full sample as well as in sub samples—in financial and nonfinancial sectors—in developed and emerging markets and by SWFs with different levels of corporate governance.

⁴ Datastream is the only data vendor that provides total return stock market indices for all the relevant countries, correcting index returns for the implications of dividend payments, stock splits, and other such changes.

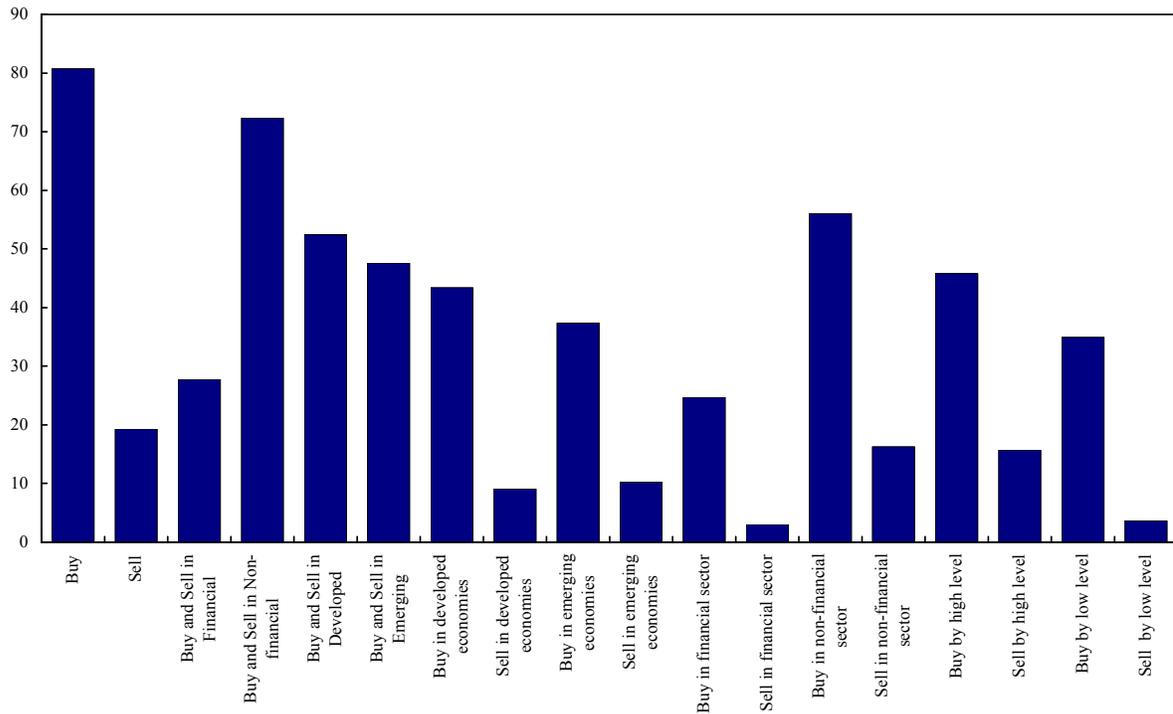
⁵ The score of each SWF is from the "total" score of Truman (2008a; 2008b). We take those higher than 40 as "high", while those lower than 40 as "low" in the econometric analysis.

Table 1. Country of Target Firms

Country	Number
Australia	6
Austria	1
China	17
Egypt	2
France	8
Germany	7
Iceland	1
India	13
Indonesia	5
Italy	6
Japan	2
Malaysia	7
Pakistan	4
Philippines	1
Portugal	2
Singapore	22
South Korea	3
Spain	3
Sweden	2
Switzerland	2
Taiwan Province of China	1
Thailand	2
United Kingdom	31
United States	17
Vietnam	1
Total	166

Table 2. Acquiring SWFs

SWF	Number of Observations	Country
Abu Dhabi Investment Authority (ADIA)	26	United Arab Emirates
China Investment Corporation (CIC)	11	China
Government of Singapore Investment Corporation (GIC)	38	Singapore
Kuwait Investment Authority (KIA)	14	Kuwait
Korea Investment Corporation (KIC)	1	Korea
Libyan Investment Authority (LIA)	2	Libya
Mubadala	2	United Arab Emirates
Qatar Investment Authority (QIA)	23	Qatar
Temasek	49	Singapore
Total	166	

Figure 1. Ratios of SWF Investments and Divestments

Note: 1) The SWFs with high level corporate governance refer to those whose total score is higher than 40, while low level refer to lower than 40 (Truman, 2008a; 2008b); 2) the ratios are calculated separately on the following six sub-groups: i) buy and sell; ii) buy and sell in financial sector, buy and sell in nonfinancial sector; iii) buy and sell in developed economies, buy and sell in emerging economies, iv) buy in developed economies, sell in developed economies, buy in emerging economies, sell in emerging economies; v) buy in financial sector, sell in financial sector, buy in nonfinancial sector, sell in nonfinancial sector; and vi) buy by high level governance, sell by high level governance, buy by low level governance, sell by low level governance.

B. Methodology

If markets are rational, the effects of an event should be reflected immediately in stock returns and prices. Thus, a measure of the event's impact can be constructed using stock prices and returns observed over a relatively short time period. To benchmark the returns of the stock relative to the event, the overall stock market returns, in percentage changes, for the corresponding country are used.

Specifically, the following steps are taken for implementing the event study:

- **Determination of the selection criteria for the inclusion of given SWFs.** The sample contains several SWFs, which have bought or sold stakes in financial firms and nonfinancial firms.

- **Collection of a number of such events and compilation of a list of firms and dates** by searching publicly-available databases to find news announcements on SWFs' actions.
- **Identification of the events of SWFs' investments/divestments.** Since the event date can be determined with precision, as regards to the short-term analysis, we employ a five-day (seven-day) event window, comprised of two (three) pre-event days, the event day, and two (three) post-event days. In this way, rumors that precede the formal announcement can enter the assessment. And as well, in illiquid markets, prices may take a couple of days to adjust to new information. As robustness tests, we vary the event window to four pre-event days, the event day, and four post-event days.
- **Definition of the "estimation window."** Following Peterson's framework (1989), we will estimate the market model on the 200 trading days ending 30 days prior to the announcement of the investments/divestments. Ending the sample prior to the event assures that the "normal" behavior of returns is not contaminated by the event itself. For robustness tests, we vary the estimation periods (100 days and 300 days) and using price indices instead of total returns of each firms and economy.
- **Prediction of a "normal" return during the event window in the absence of the event,** using a one factor OLS regression equation:⁶

$$r_{it} = \alpha_i + \beta_i r_{mt} + e_{it},$$

Where r_{it} is the percentage change of returns of the stock relative to the event, r_{mt} is the percentage change of overall stock market returns, α_i and β_i are regression coefficients, and the e_{it} is an error term.

- **Calculation of the abnormal return within the event window.** Having calculated estimates of α_i and β_i with the data from the estimation period, we calculate the abnormal returns by differencing the actual and estimated returns,

$$AR_{it} = R_{it} - R_{it}^* = R_{it} - (\alpha_i^* + \beta_i^* R_{mt}^*), \text{ where } R_{it}^* \text{ is the estimated return.}$$

Specifically, the abnormal return observations must be aggregated in order to draw overall inferences for the event of interest. The aggregation can be along two dimensions—through time and across securities.

⁶ Since the "market model" is most commonly used to generate expected returns and no better alternative has yet been found despite the weak relationship between beta and actual returns (Armitage, 1995), we use the market model to predict "normal" return. To test for robustness, a three-factor model could also be employed.

The individual securities' abnormal returns, in the case of five days, can be aggregated for each event day, $t = t-2, t-1, t, t+1, t+2$ during the event window. Given N events (a total of 166 in the entire sample), the sample average aggregated abnormal returns (AAR) for period t is

$$AAR_t = \frac{1}{N} \sum_{i=1}^N AR_{it} .$$

The average abnormal returns can then be aggregated over the event window to calculate the cumulative average abnormal return (CAAR) for each firm i .

$$CAAR_t = \sum_{t=-2}^2 AAR_t$$

- **Testing whether the abnormal return is statistically different from zero.** Since the numbers of observation in the event window are limited (five or seven days), we use t-tests rather than the Z score, the latter usually requiring at least 50 observations to get a statistically robust results.⁷

C. Empirical Results

Table 3 presents the AAR and CAAR for the (-2, +2), and (-3, +3) windows. In general, the AAR is positively associated with SWFs' buy actions and not significantly negatively with SWFs' sell actions in the full sample. Moreover, overall, the results suggest that the share price's combined responses to SWFs' investments and divestments in developed economies are significant (Panel C), while those in emerging economies are not (Panel D). In addition, SWF investments in the financial sector have a larger impact on share prices than in the nonfinancial sector. These differences in responses may be due to the relatively more transparent equity markets in developed economies as well as in the financial sector with potentially higher signaling and information flow.

⁷ The t test is of interest because it can accommodate the differences of the abnormal returns over time and especially across types of markets. The event study approach shows the explicit impact of SWF actions, since the methodology is based on individual purchases and sales of publicly available equities.

Table 3. Stock Market Reactions to Announcements of SWF Investments and Divestments (Total Returns)

Event Window	Test Statistic of AAR	Mean of AAR	Test Statistic of CAAR	Mean of CAAR
Panel A: Buy only, 134 events from 101 firms				
(-3,+3)	3.75**	0.22	4.45***	0.96
(-2,+2)	4.31**	0.27	3.33**	0.77
Panel B: Sell only, 32 events from 23 firms				
(-3,+3)	-0.08	-0.02	-1.21	-0.19
(-2,+2)	0.00	0.00	-0.31	-0.07
Panel C Buy and Sell in developed economies only, 87 events from 55 firms				
(-3,+3)	2.88**	0.18	6.17***	0.94
(-2,+2)	4.29**	0.21	4.95**	0.72
Panel D: Buy and Sell in emerging economies only, 79 events from 60 firms				
(-3,+3)	0.98	0.11	1.14	0.20
(-2,+2)	1.20	0.17	1.67	0.34
Panel E: Buy in developed economies only, 72 events from 51 firms				
(-3,+3)	3.13**	0.24	5.82***	1.21
(-2,+2)	5.47**	0.30	4.44**	0.91
Panel F: Sell in developed economies only, 15 events from 9 firms				
(-3,+3)	-0.56	-0.16	-2.99**	-0.77
(-2,+2)	-0.49	-0.19	-1.24	-0.44
Panel G: Buy in emerging economies only, 62 events from 50 firms				
(-3,+3)	2.37*	0.20	2.94**	0.69
(-2,+2)	2.07	0.24	2.31*	0.60
Panel H: Sell in emerging economies only, 17 events from 14 firms				
(-3,+3)	0.37	0.09	1.62	0.29
(-2,+2)	0.44	0.16	0.99	0.23
Panel I: Buy in financial sector only, 41 events from 24 firms				
(-3,+3)	3.09**	0.66	6.38***	3.40
(-2,+2)	2.72*	0.70	5.13**	2.53
Panel J: Sell in financial sector only, 5 events from 3 firms				
(-3,+3)	-	-	-	-
(-2,+2)	-	-	-	-
Panel K: Buy in non-financial sector only, 93 events from 77 firms				
(-3,+3)	-0.15	-0.01	-4.06**	-0.35
(-2,+2)	0.31	0.04	-1.78	-0.18
Panel L: Sell in non-financial sector only, 27 events from 20 firms				
(-3,+3)	-0.08	-0.02	-1.21	-0.19
(-2,+2)	0.00	0.00	-0.31	-0.07
Panel M: Buy by high level in governance only, 76 events from 59 firms				
(-3,+3)	0.18	0.02	0.84	0.07
(-2,+2)	-0.11	-0.02	-0.20	-0.02
Panel N: Sell by high level in governance only, 26 events from 19 firms				
(-3,+3)	0.27	0.06	1.04	0.15
(-2,+2)	0.36	0.12	0.85	0.17
Panel O: Buy by low level in governance only, 58 events from 45 firms				
(-3,+3)	2.21*	0.50	4.05**	2.22
(-2,+2)	2.68*	0.68	3.03**	1.89
Panel P: Sell by low level in governance only, 6 events from 4 firms				
(-3,+3)	-1.15	-0.53	-3.67**	-2.39
(-2,+2)	-1.23	-0.73	-1.96	-1.61

Source: IMF staff estimates.

Note: Since there are no qualified observations before/after the corresponding event dates, there are no results for the group of "sell in financial sector only (Panel J)".

Different scenarios are tested using these events. Specifically, Panel A of Table 3 reports the AAR and CAAR around the announcements of SWF investments for the entire sample of 134 observations during the period between 1990 and 2009. The AAR is 0.27 percent and 0.22 percent for windows of (-2, +2), and (-3,+3) around the announcement date, and the CAAR is 0.77 percent and 0.96 percent, respectively. The sign test statistics for the AAR are also highly significant for the two windows. Panel B reports the AAR and CAAR around the announcements of SWF divestments for the entire sample of 32 observations during the period between 1990 and 2009. The AAR is 0 percent and -0.02 percent for the windows (-2,+2), and (-3, +3) around the announcement date, and the CAAR is -0.07 percent and -0.19 percent, respectively. The sign test statistics for the AAR and the CAAR are insignificant for the two windows.

Panel C reports the AAR and CAAR around the announcements of SWF investments and divestments for the developed economy sample of 87 observations during the period between 1990 and 2009. The AAR is 0.21 percent and 0.18 percent for the windows (-2, +2), and (-3,+3) around the announcement date, and the CAAR is 0.72 percent and 0.94 percent, respectively. The sign test statistics for the AAR and the CAAR are highly significant for the two windows. Panel D of Table 3 reports the AAR and CAAR around the announcements of SWF investments and divestments for the emerging economy sample of 79 observations during the period between 1990 and 2009. The AAR is 0.16 percent and 0.11 percent for the windows (-2,+2), and (-3, +3) around the announcement date, and the CAAR is 0.34 percent and 0.20 percent, respectively. The sign test statistics for the AAR and CAAR are insignificant for the two windows.

The impact is further analyzed on the investments/divestments separately in different market types (developed and emerging markets), different sectors (financial and nonfinancial), and level of corporate governance (high and low). In general, according to the AAR, investments in developed economies (Panel E) and emerging economies (Panel G) are statistically significant, while divestments in developed economies (Panel F) and emerging economies (Panel H) are generally statistically insignificant. These demonstrate that SWF investments produce positive impact in both developed and emerging economies while their divestments led to little negative impact.⁸In addition, the positive impact of ARR and CAAR for the investments by low level governance SWFs are significantly larger than those by high level governance SWFs because the investment/divestment behaviors of low level governance SWFs may be more speculative and unexpected, thus triggering larger market impact upon the announcement of their actions. This is in line with the idea that transparency matters.

⁸ While the combined impact of investments and divestments in emerging economies (Panel D) is insignificant, the impact of investment in emerging economies is significant (Panel G). The reason could be the individual impact of investments was offset by the divestments when both actions are jointly tested.

This could also indicate that the improvement of corporate governance in SWFs would be helpful in reducing the impact on market volatility⁹.

As a robustness check, we use the event window of (-4,+4) to test the impact of SWFs' actions. In addition, we vary the estimation periods (100 and 300 days). Finally, we use price indices of each firms and economy instead of total return. The results are robust to different event windows and the estimation periods, and the use of price indices (Table 4).

D. Conclusion

This paper assesses whether and how stock markets react to the announcements of investments and divestments to firms by SWFs using an event study approach. Based on 166 publicly traceable events collected on investments and divestments by major SWFs during the period of 1990–2009, we evaluate the short-term financial impact of SWFs on selected public equity markets in which they invest. The impact is further analyzed on different sectors (financial and nonfinancial), actions (buy and sell), market types (developed and emerging markets), countries, and level of corporate governance (high and low). Overall, this event study does not find any significant destabilizing effect of SWFs on equity markets as measured by abnormal return behavior, which is consistent with the emerging academic literature that uses the event study methodology. This study contributes to the slowly emerging field of empirical studies of SWF behavior in financial markets.

However, it should be noted that the longer-term impact and the potentially stabilizing role of SWFs as major institutional investors will require a broader set of data and a more rigorous empirical assessment. The long-run impact of SWF investments could be subject to the macroeconomic and financial conditions. In the case of recent investments in some U.S. and European financial institutions under conditions of distress, SWFs' action could not buffer those institutions from further large losses. Therefore, it will be hard to draw conclusions for overall global and regional financial stability only from these 166 events. Other methods to examine the empirical impact of SWFs would require more detailed knowledge of SWF investments and their timing and amount—data that are presently not available. Some progress may be possible with hypothetical scenarios, but hypothetical market responses to SWF investments require a thorough understanding of how asset allocations are constructed and the size, depth, and breadth of the corresponding markets.

⁹ This is in line with the positive market responses to the investments in the entire sample. The reason is that SWFs with low level of corporate governance accounts for the majority sample of SWF investments.

Table 4. Stock Market Reactions to Announcements of SWF Investments and Divestments (Price Indices)

Event Window	Test Statistic of AAR	Mean of AAR	Test Statistic of CAAR	Mean of CAAR
Panel A: Buy only, 134 events from 101 firms				
(-3,+3)	3.84**	0.22	4.71***	0.98
(-2,+2)	4.09**	0.26	3.46**	0.75
Panel B: Sell only, 32 events from 23 firms				
(-3,+3)	0.16	0.03	1.67	0.24
(-2,+2)	0.24	0.07	1.32	0.26
Panel C: Buy and Sell in developed economies only, 87 events from 55 firms				
(-3,+3)	2.83**	0.20	6.37***	1.10
(-2,+2)	5.05**	0.25	5.45**	0.87
Panel D: Buy and Sell in emerging economies only, 79 events from 60 firms				
(-3,+3)	0.94	0.10	1.33	0.20
(-2,+2)	0.98	0.14	1.58	0.28
Panel E: Buy in developed economies only, 72 events from 51 firms				
(-3,+3)	3.22**	0.25	5.66***	1.23
(-2,+2)	5.5**	0.31	4.44**	0.95
Panel F: Sell in developed economies only, 15 events from 9 firms				
(-3,+3)	-0.20	-0.05	0.67	0.14
(-2,+2)	-0.12	-0.04	1.02	0.28
Panel G: Buy in emerging economies only, 62 events from 50 firms				
(-3,+3)	2.58**	0.19	3.41**	0.69
(-2,+2)	1.94	0.21	2.37*	0.53
Panel H: Sell in emerging economies only, 17 events from 14 firms				
(-3,+3)	0.40	0.10	1.80	0.32
(-2,+2)	0.47	0.17	1.05	0.24
Panel I: Buy in financial sector only, 41 events from 24 firms				
(-3,+3)	2.91**	0.65	6.82***	3.42
(-2,+2)	2.46*	0.66	5.45**	2.45
Panel J: Sell in financial sector only, 5 events from 3 firms				
(-3,+3)	-	-	-	-
(-2,+2)	-	-	-	-
Panel K: Buy in non-financial sector only, 93 events from 77 firms				
(-3,+3)	-0.10	-0.01	-3.83**	-0.35
(-2,+2)	0.35	0.04	-1.56	-0.17
Panel L: Sell in non-financial sector only, 27 events from 20 firms				
(-3,+3)	0.16	0.03	1.67	0.24
(-2,+2)	0.24	0.07	1.32	0.26
Panel M: Buy by high level in governance only, 76 events from 59 firms				
(-3,+3)	0.11	0.02	0.68	0.06
(-2,+2)	-0.22	-0.04	-0.50	-0.07
Panel N: Sell by high level in governance only, 26 events from 19 firms				
(-3,+3)	0.27	0.06	0.91	0.14
(-2,+2)	0.38	0.12	0.92	0.18
Panel O: Buy by low level in governance only, 58 events from 45 firms				
(-3,+3)	2.26*	0.51	4.07**	2.26
(-2,+2)	2.72*	0.69	3.04**	1.91
Panel P: Sell by low level in governance only, 6 events from 4 firms				
(-3,+3)	-0.32	-0.13	1.64	0.88
(-2,+2)	-0.40	-0.23	1.21	0.75

Source: IMF staff estimates.

Note: Since there are no qualified observations before/after the corresponding event dates, there are no results for the group of "sell in financial sector only (Panel J)".

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